UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

July 3, 1985

Docket Nos. 50-259, 50-260, 50-296, 50-327,
50-328, 50-390, 50-391, 50-438,
and 50-439

Mr. Charles Dean, Chairman
Board of Directors
Tennessee Valley Authority
400 West Summitt Hill Drive
Knoxville, Tennessee 37902

Dear Mr. Dean:

The Staff is concerned about performance deficiencies at TVA's nuclear facilities as indicated by a sustained and consistent history of poor performance and from a number of more recent events at TVA's nuclear facilities. Enclosed is a brief review and discussion of major performance areas upon which the Staff bases its concern. Please review the enclosed material and provide me with your comments and plans to resolve identified management and performance problems as soon as possible.

Sincerely,

William J. Dircks
Executive Director for Operations

Enclosure:
Areas of Staff Concern

cc: See next page

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ENCLOSURE 1

AREAS OF STAFF CONCERN

This enclosure presents a number of areas in which TVA as a whole, and selected sites in particular, are perceived by the NRC staff as showing performance problems. Also, Section 5 of this enclosure contains information regarding the TVA managerial structure and experience levels.

1.0 ALLEGATIONS AND TVA EMPLOYEE CONCERNS PROGRAM

The NRC has received a number of allegations from TVA employees regarding a variety of issues surrounding quality assurance and control at TVA corporate offices and at the TVA nuclear sites. Most of the allegations have been received anonymously through either a Congressional staff member or by anonymous telephone calls to NRC headquarters staff members. The staff believes these allegations indicate a lack of confidence in TVA management. Many allegers have claimed that TVA would take retaliatory actions if these concerns were expressed through the normal TVA process. Also, several allegations were received asserting that TVA had taken intimidating or reprisal type actions against certain employees.

The allegations raise a number of questions and concerns. First, some of the allegations themselves raise safety issues that must be reviewed and evaluated.

Second, because many of the allegations brought to the NRC reflect previously identified issues which had been resolved by TVA, questions arise about TVA's ability to resolve safety questions for themselves. Third, because of the alleged reprisals and intimidations taken by TVA, the allegations raise question about TVA's overall philosophy and programs for dealing with employees while solving these safety concerns.

Based on these concerns, NRC has underway a number of actions. Each allegation is being evaluated on its merits. This has involved NRC staff headquarters and Region II efforts. Also, the concerns have been sent to TVA for their evaluation.

TVA met with NRC staff management to review the apparent ineffectiveness of their employee concern program and to discuss the changes TVA would be making to improve the program. Although TVA concluded that all concerns that were raised within TVA had been resolved acceptably, TVA proposed to improve the employee concerns program through a number of actions.

The staff recognizes that allegations from utility employees are not particularly unusual, especially for plants under construction. However the nature of the allegations and the degree to which employees expressed fear of reprisals from TVA, lead the staff to remain concerned about the adequacy of TVA programs in this area.

## 2.0 TVA SALP HISTORY

The Tennessee Valley Authority (TVA) has five units in operation at two sites and four units under construction at two other sites which were included in the three previous SALP evaluations of management effectiveness. At the beginning of the most recent appraisal period (1/1/83 - 2/29/84), all of the TVA sites had major weaknesses in certain areas. Facility evaluations during the most recent SALP assessment period were as follows:

- The Sequoyah facility had improved in overall performance with improvement noted in three functional areas. Problems in emergency preparedness related to a weak organizational structure resulted in the rating decreasing from a Category 2 to a Category 3 in this functional area. Quality assurance weaknesses stemming primarily from problems in the management of the offsite audit organization resulted in this functional area performance rating continuing to be rated as a Category 3.

  The Watts Bar overall performance remained consistent from the previous SALP period with improvement in some areas but one major weakness was identified in support systems.

- The Bellefonte overall performance improved slightly from the previous SALP period with improvement noted in three functional areas.

o Browns Ferry overall performance remained acceptable, although all of the areas identified in the previous SALP as having major weaknesses (plant operation, radiological concerns, maintenance, security and safeguards, and quality assurance) still had major weakness and still needed additional management attention. Major weaknesses were also identified in refueling operations which required additional management attention. Based on continuing concerns as identified in the SALP process, TVA developed a Regulatory Performance Improvement Program (RPIP) to address the problems and to focus increased management attention toward identifying and correcting the problems.

Increased Regional effort was expended to monitor the progress of the Regulatory Improvement Program. A third resident inspector was assigned and a Regional supervisor conducted monthly on-site reviews of the licensee's efforts to affect improvement in performance. In addition, quarterly meetings between senior Regional and licensee management were conducted. In spite of increased attention by management, the performance at Browns Ferry improved only marginally. It appears that the RIP is not significantly affecting performance as significantly as similar programs have at other Region II facilities (e.g., Brunswick, Grand Gulf and Turkey Point).

A review of the TVA SALP ratings history as indicated in the attached Table 1 shows only a moderate level of overall improvement at Sequoyah and Bellefonte with no overall improvement at Watts Bar. In the case of Browns Ferry, overall

performance downtrend was noted with failure to demonstrate significant improvement in any of the areas that had previously been judged to need additional management attention.

A review of the SALP ratings history of two utilities with a comparable nuclear commitment is shown in Table 2 and 3. These tables indicate that the size of TVA need be neither a contributor to the low SALP ratings nor an inhibitor to improving many function area ratings to a category 2 or 1.

Figures 1 through 4 provide a summary of the number of Region II facilities that received a category 1, 2 or 3 rating in each of the same functional areas. Comparison of the Region II facilities with TVA SALP HISTORY indicates that, as a utility, TVA has only one facility rating above average (Sequoyah), two facilities rating about average (Bellefonte and Watts Bar) and one facility rating below average (Browns Ferry).

Overall the staff considers that TVA's performance has been marginally satisfactory and has improved in some functional areas while remaining relatively weak in others. Management involvement is marginally improving with some noticeable effect at Bellefonte, Sequoyah, and Watts Bar, while Browns Ferry has failed to demonstrate significant improvement in any of the functional areas indicating the continued need for a high level of NRC and TVA attention.

## 3.0 REVIEW OF ENFORCEMENT HISTORY

A review of TVA enforcement history was performed focusing on management related violations and severity levels over the last four years (July 1981 to June 1985). A violation or deviation was designated as management related if it matched one of the following general areas:

Inadequate Control Systems/Procedures
No Procedure available (where appropriate to have one)
Quality Assurance Programmatic Problems
Inadequate Evaluations
Inadequate Design
Inadequate Testing Procedures
Inadequate Scheduling and Followup of Commitments
Timeliness of Corrective Actions
Recurring Violations

These areas were chosen to indicate programmatic review standards set by management for procedure quality, evaluation and implementation along with the utilities problem followup/resolution intensity.

Figure 5, 6, 8 and 9 compare TVA with only one other utility with a similar nuclear commitment in terms of number of units. The large discrepancies in the quantitative values presented in these figures may not be as striking if a greater number of utilities were compared. Figure 7 is an attempt to compare TVA enforcement history at the site level to a greater number of utilities.

Figure 5 compares the total number of violations at TVA facilities to that of a utility with comparable nuclear commitment. TVA has received over one thousand violations in the past four years which is greater than twice as many violations as that received by the other utility. Figure 6 provides the same total violations comparison on a unit basis. Figure 6 also highlights the violation history for each TVA site/unit and denotes Browns Ferry as the weaker site in need of continued management attention.

Figure 7 shows the operations phase violations/utility/site and indicates that TVA operating sites have received three times as many violations as the national average (23) and twice as many as the Region II average (35) during the period of September 1983 to February 1985. The staff recognizes that this comparison, on a per site basis has a slight bias against those sites with multiple units. Nonetheless, we believe this overall comparison is basically valid.

Figure 8 analyzes the civil penalty history of TVA and compares it to another utility of similar nuclear commitment. Over the four year time period, TVA had 14 civil penalties with a total dollar value of $910,625 compared to four civil penalties with a dollar value of $134,000 for the other utility.

Figure 9 analyzes the civil penalty history of TVA and compares it to another large utility. TVA has had 39.1 percent of its violations fall into one of the previously described management related areas while the other utility only had 20.7 percent.

The disproportionate magnitude of violations, number and severity level of civil penalties, and management related nature of the violations when compared to other utilities serves to highlight the overall management weakness.

## 4.0 TVA OPERATING EXPERIENCE

The staff has performed a review of the operating histories of the Browns Ferry Units 1, 2 and 3 and Sequoyah Units 1 and 2 to determine how the types of events, and frequency of malfunctions reported compared to other plants. The body of information examined included the precursor study, "Precursors to Potential Severe Core Damage Accidents: 1969-1979 and 1980-1981, A Status Report", reactor trip and ESF actuation compilations from the AEOD 1984 Semi-Annual Reports and previous staff reviews, Abnormal Occurrences (NUREG/CR-0900) from 1980 through the third quarter 1984 and recent reports on operating events at TVA plants. Several measures relating to operating experience for the TVA plants were then compared to those of several other plants of similar type and age. The aim was to determine if TVA's operating facilities performed differently.

The precursor study stated that two of the most significant incidents in nuclear power plant operating history have occurred at Browns Ferry, namely the fire at Browns Ferry Unit 1 (1975) and the partial scram at Unit 3 (1980). While other BWRs of a similar age such as Brunswick Units 1 and 2 have had more precursor events, none were judged to have as significant an impact on core melt potential as the Browns Ferry Units 1 and 3 events.

The staff believes that the scram rates and the number of ESF (Engineered Safety Features) actuations are measures of plant reliability and performance.

The data on plant trips from 1980 to 1984 indicates that with the exception of 1984, the Browns Ferry units generally are above similar plants and the industry average in the number of automatic reactor trips (scrams) per year.

From 1980 through 1983, the Sequoyah units have demonstrated a scram rate approximately equal to the average for all PWRs. However, in 1984, both Sequoyah Units 1 and 2 show a higher than average scram rate.

A review of ESF actuations from January 1, 1984 through June 30, 1984 indicates that the Sequoyah units have experienced a much higher number than comparable PWRs. Similar high numbers of ESF actuations at Browns Ferry did not occur. The large number of these actuations would indicate that the plant staff was not effectively diagnosing or correcting the causes.

A review of Abnormal Occurrences from 1980 through the third quarter 1984 indicated that two AOs were reported in 1984 at Browns Ferry Unit 1, none at the similar BWR plants. In addition, very recently (1985) Browns Ferry experienced a significant event dealing with an anomaly in the reactor vessel water level instrumentation. While other plants have reported two AOs, at Brunswick Units 1 and 2 (1981 and 1983) and Quad Cities Units 1 and 2 (1982 and 1983), only Browns Ferry had two AOs in one year. Civil penalties were levied for both Browns Ferry AOs. Brunswick and Quad Cities each received a civil penalty for one of their two AOs. Deficiencies in management were specifically identified in one of the Brunswick and Quad Cities AOs.

No AOs have been reported at Sequoyah during its operating life. However, the incore probe seal table leak event in 1984 has been identified as a significant concern involving a major breakdown in administrative controls which is undergoing continued staff evaluation. Of the other comparison PWRs, only Farley had an AO reported (1982) and received a civil penalty.

An assessment of the AO compilation does not indicate that either Browns Ferry or Sequoyah are very different from similar plants. However, because both Browns Ferry AOs and the Sequoyah seal table event occurred in 1984, it is apparent that the TVA plants experienced greater operating difficulties of a significant nature that year than in previous years. No other utility has had this number of significant events in one year.

The staff notes that there have been a host of other operational events that have occurred at TVA plants that serve to further illustrate their operational problems. These are briefly described in Table 4.

In summary, it appears TVA has encountered operational problems at a greater frequency than most other facilities.

## 5.0 Management Structure and Experience

The NRC staff has developed an experience profile of TVA management by position and compared this TVA profile with the experience profile in similar positions in two other utilities that have a comparable nuclear commitment. These

comparisons are illustrated in Tables 5 thru 15. These profiles generally indicate that even though TVA was an early leader in commitment to nuclear power, the current management both at "corporate" and at individual plants is weak in total nuclear experience and in actual operating experience in a nuclear plant. Even though Regulatory Guides and ANSI Standards provide little guidance on management qualifications, the NRC staff is of the view that there is a relationship between plant performance and the nuclear operating experience or background of key managers. Corporate leaders with a strong nuclear background insure that enough key positions both at the plant and corporate have sufficient nuclear experience to be successful in the position, and to be able to use their personal experience in analyzing problems and making decisions.

During the past 5-6 years, TVA has lost a number of key managers (eight) (Assistant Plant Superintendent and above) with extensive nuclear and operating experience. TVA has also lost a number of licensed reactor operator and SRO's to other utilities. The key managers generally would meet the experience profile that we associate with an above average plant or utility. As a result of private discussions with some of these individuals, we believe this loss of key personnel was due to a combination of salary limits and other fringe benefits as a result of being federal employees, and TVA previous policies which result in promotion of persons to middle and upper level management positions regardless of their nuclear experience profiles. Past TVA policy that prevented onsite engineers from being licensed as RO/SRO's also appears to have contributed to the loss of personnel with nuclear experience. Previously all RO and SRO candidates were selected from nondegreed individuals.

A review of TVA organizational structure when compared with the other sample utilities indicates significant differences. The two major differences involve span of control and assignment of essential technical support services such as engineering design and construction. These technical support services are not an integral part of the line organization. Accordingly, this support is not under line management's control. It is not until the TVA structure reaches the senior vice president level (i.e., Manager, Power and Engineering) that all required technical services are centralized. At this level the office functions include both nuclear and non-nuclear activities. This structure could be a prime factor in the apparent lack of timely response and effectiveness for resolution of potentially significant safety issues.

The staff notes that TVA has recently undertaken reorganizations at each of its operational sites (including Watts Bar) to effect more timely resolution of potential safety issues. This action is essentially a decentralization of plant-specific engineering staff deemed necessary to support the operating staff. TVA may not have yet had time to demonstrate this as a viable option to solve management's problem. The staff is cautiously encouraged by this action.

TVA has initiated some policy changes that in time should correct the weaknesses in nuclear and operating experience of some of the lower levels of management. TVA has changed the salary structure for licensed RO's and SRO's to be competitive with the nuclear industry. This has reduced turnover of this group. They are slowly rebuilding their core of RO's and SRO's at Browns Ferry, but extensive overtime is still required during certain evolutions.

Both Sequoyah and Watts Bar have a sufficient number of RO and SRO's to meet work demands without relying an excessive overtime. TVA has initiated a program that will result in some Shift Technical Advisors (STA) and other engineers being licensed as an SRO, and be fully qualified as an assistant shift engineer. The first small group is scheduled to complete this program in mid 1986. A similar program is underway for current SRO's to obtain a degree.

Compensation for RO's and SRO's has been increased. The total compensation of a few SRO's at Browns Ferry with overtime pay was on par with the Plant Manager's salary the last two years. Salaries of middle level managers have also been increased, however, the limits on federal salaries continues to limit TVA's ability to competitively recruit and retain both middle and upper level managers for key positions.

In summary, while some efforts appear to have been made to improve TVA's lower level management recruitment and compensation, we believe there is a significant lack of nuclear operations experienced key managers and this deficiency could be a prime cause for the problems being encountered throughout the TVA organization.

## TVA SALP HISTORY

| Rating Category | Watts Bar | | Bellefonte | |
|---|---|---|---|---|
| (SALP CYCLE) | III | IV | III | IV |
| Soils and Foundation | NR | 1 | NR | NR |
| Containment, etc. | NR | 2 | 2 | 2 |
| Piping Systems and Supports | 2 | 2 | 3 | 2 |
| Safety Related Components | 2 | NR | 2 | 2 |
| Support Systems | 2 | 3 | NR | 2 |
| Elect. Power and Dist. | 2 | 2 | 2 | 2 |
| Inst. and Control Systems | 2 | NR | 2 | 1 |
| Licensing Activities | 2 | 2 | 2 | NR |
| Quality Assurance Program | 3 | 2 | 2 | 2 |
| Preop/Construction Testing | 2 | 2 | 3 | 2 |

| Rating Category | Browns Ferry | | | Sequoyah | |
|---|---|---|---|---|---|
| (SALP CYCLE) | II | III | IV | III | IV |
| Plant Operations | 3 | 3 | 3 | 2 | 2 |
| Radiological Controls | 3 | 3 | 3 | 2 | 1 |
| Maintenance | 2 | 3 | 3 | 2 | 1 |
| Surveillance | 2 | 2 | 2 | 1 | 1 |
| Fire Protection | 3 | 2 | NR | NR | 1 |
| Emergency Preparedness | NR | 2 | 2 | 2 | 3 |
| Security and Safeguards | 2 | 3 | 3 | 3 | 2 |
| Refueling | 2 | 1 | 3 | 2 | 1 |
| Licensing Activities | NR | 2 | 2 | 2 | 2 |
| Quality Assurance Program | 2 | 3 | 3 | 3 | 3 |

NR - Not Rated

TABLE 1

## COMPARABLE UTILITY SALP HISTORY

| Rating Category | Site 1 | | | Site 2 |
|---|---|---|---|---|
| (SALP CYCLE) | II | III | IV | II |
| Soils and Foundation | NR | NR | NR | NR |
| Containment etc. | 1 | 2 | 2 | NR |
| Piping Systems and Supports | 2 | 1 | 2 | 1 |
| Safety Related Components | 2 | NR | NR | NR |
| Support Systems | NR | NR | 2 | 2 |
| Elect. Power Supply and Dist. | 2 | 2 | 2 | 1 |
| Inst. and Control Systems | NR | 2 | 2 | 1 |
| Licensing Activities | 2 | 2 | 2 | 2 |
| Quality Assurance Program | -- | 1 | 1 | -- |

| Rating Category | Site 2 | | | Site 3 | | |
|---|---|---|---|---|---|---|
| (SALP CYCLE) | II | III | IV | II | III | IV |
| Plant Operations | 2 | 1 | 3 | 2 | 2 | 1 |
| Radiological Controls | 1 | 1 | 2 | 2 | 2 | 2 |
| Maintenance | 1 | 1 | 2 | 1 | 1 | 1 |
| Surveillance | 1 | 2 | 2 | 2 | 3 | 1 |
| Fire Protection | 2 | 2 | NR | 2 | NR | NR |
| Emergency Preparedness | 1 | 1 | 1 | 1 | 2 | 1 |
| Security and Safeguards | 2 | 1 | 2 | 1 | 1 | 1 |
| Refueling | 1 | 1 | 1 | 1 | 1 | 1 |
| Licensing Activities | 2 | 1 | 2 | 2 | 2 | 2 |
| Quality Assurance Program | -- | 2 | 1 | -- | 2 | 2 |

NR - Not Rated

TABLE 2

## COMPARABLE UTILITY SALP HISTORY

| Rating Category | Site 1 | | | Site 2 | | |
|---|---|---|---|---|---|---|
| (SALP CYCLE) | II | III | IV | II | III | IV |
| Soils and Foundation | NR | NR | NR | NR | NR | NR |
| Containment etc. | 1 | 2 | 2 | 2 | 2 | 2 |
| Piping Systems and Supports | 2 | 2 | 2 | 2 | 2 | 3 |
| Safety Related Components | 2 | 3 | 2 | 2 | 3 | 3 |
| Support Systems | NR | 3 | 2 | 2 | 3 | 2 |
| Elect. Power Supply and Dist. | 3 | 3 | 2 | 2 | 3 | 2 |
| Inst. and Control Systems | 2 | NR | 2 | 2 | NR | 2 |
| Licensing Activities | 2 | 1 | 2 | 2 | 1 | 2 |
| Quality Assurance Program | 2 | 3 | 2 | 3 | 3 | 3 |
| Preop/Const. Testing | 2 | 3 | 3 | NR | 3 | 2 |
| Envir. Proj./Indep Measure | - | - | - | NR | 2 | NR |
| Radiological Cont. | 2 | 2 | 2 | NR | 2 | 2 |
| Reinspection Program | NR | NR | 1 | | | |
| Fire Protection | NR | NR | 3 | | | |
| Security | NR | NR | 2 | | | |
| Emergency Preparedness | NR | NR | 2 | | | |

| | Site 3 | | | Site 4 | | |
|---|---|---|---|---|---|---|
| (SALP CYCLE) | II | III | IV | II | III | IV |
| Plant Operations | 3 | 2 | 2 | 1 | 2 | 3 |
| Radiological Controls | 3 | 2 | 3 | 2 | 2 | 2 |
| Maintenance | 2 | 3 | 3 | 2 | 2 | 2 |
| Surveillance | 2 | 2 | 1 | 2 | 1 | 1 |
| Fire Protection | 3 | 2 | 2 | 2 | 1 | 2 |
| Emergency Preparedness | 1 | 2 | 1 | 2 | 2 | 1 |
| Security and Safeguards | 1 | 1 | 2 | 2 | 1 | 1 |
| Refueling | 1 | 1 | 1 | 1 | 1 | 1 |
| Licensing Activities | 1 | 1 | 2 | 1 | 1 | 1 |
| Quality Assurance Program | 3 | 2 | 2 | NR | NR | 2 |

| | Site 5 | | | Site 6 | | |
|---|---|---|---|---|---|---|
| (SALP CYCLE) | II | III | IV | II | III | IV |
| Plant Operations | 2 | 2 | 2 | NR | 2 | 3 |
| Radiological Controls | 3 | 2 | 2 | 2 | 2 | 2 |
| Maintenance | 2 | 2 | 1 | 2 | 1 | 2 |
| Surveillance | 2 | 2 | 2 | 3 | 3 | 2 |
| Fire Protection | NR | 2 | 2 | 2 | 2 | 2 |
| Emergency Preparedness | 2 | 2 | 2 | 2 | 2 | 2 |
| Security and Safeguards | 2 | 2 | 3 | 3 | 3 | 2 |
| Refueling | 1 | 1 | 1 | NR | 1 | 1 |
| Licensing Activities | 2 | 2 | 1 | NR | 2 | 2 |
| Quality Assurance Program | NR | NR | 2 | 2 | NR | 2 |
| Preoperational Test/SU Test | | | | NR | 2 | 2 |

NR - Not Rated

TABLE 3

TABLE 4

RECENT OPERATING EXPERIENCES

| Inspection Report | Event |
|---|---|
| Browns Ferry - | |
| 80-24 | Inadequate heat transfer on straps for reactor level lines lead to erroneous indications. |
| 80-32 | Failure of rods to fully insert on reactor scram-Unit 3. |
| 80-35 | Misoriented fuel bundles during operation. |
| 81-28 | Flooding of "A" RHRSW pump room. |
| 81-14 | Primary leak Unit 3. |
| 81-17 | Personnel Overexposure. |
| 82-23 | Loss of Secondary Containment leads to all units shutdown, major problems found. |
| 82-46 | Unisolable feedwater leak, Unit 1. |
| 83-02/82-48 | Loss of shutdown cooling event. |
| 83-05 | Reactor vessel head lifted during safety injection, drywell flooded with 44,000 gal. of primary coolant. |
| 83-18 | Fuel loaded in fuel racks that were not tested for boral. |
| 83-27 | Backup Control Center operability not verified since original construction. |
| 82-40 | IGSCC identified by inspectors; not the licensee, licensee had already completed inspections as satisfactory. |
| 83-33 | APRM gain adjustments made incorrectly, R factor out of spec. |
| 83-36 | Use of inadequately designed MSRV tailpipe vacuum relief valves during operation. |
| 83-43/83-46 | Failure of SDIV level switch due to inadequate design and surveillance. |

| Inspection Report | Event |
|---|---|
| 83-44 | Personnel overexposure. |
| 83-55 | EECW/Diesel generator HEX inadequate design. |
| 84-02 | Improper reactivity control, RSCS/RWM inoperable. |
| 84-07 | Non-conservative Kf factor in computer, used for MCPR calculations. |
| 84-07 | Both CAD systems inoperable, used for LOCA. |
| 84-07 | Failure of shutdown cooling suction valve, prevented cooling down reactor. |
| 84-20 | Cable separation problem; RDS/HPCI systems. |
| 84-20 | Diesel Generator parallel operation not possible due to inadequate design. |
| 84-20 | Shutdown board room cooling inadequate design during accident scenario. |
| 84-34 | Core spray overpressurization event. |
| 85-13/85-15 | Reactor water level problem - Unit 3. |
| 84-45 | RWM inoperable on startup, Unit 3. |
| 84-52/84-53/85-15 | Numerous limitorque valve failures. |
| 85-06/85-12 | HPCI valve inoperable; timing problem and PCIS valve inoperable for core spray system. |
| 85-25 | HPCI torus suction valve motor incorrectly wired. |
| 85-21/85-26 | Inadequate torus mods; hangars and supports and snubbers, Inadequate 79-02 and 79-14 inspections. Massive re-work required. |
| Sequoyah - | |
| 84-24 | Seal Table Event. |
| NRC ORDER | Containment Pressure Transmitters. |

## SENIOR MANAGEMENT

TABLE 5

| Professional Experience (yrs) | TVA Experience (yrs) | Nuclear Experience (yrs) | Operating Nuclear Experience Onsite (yrs) | TVA / UTILITY X | Professional Experience (yrs) | Utility Experience (yrs) | Nuclear Experience (yrs) | Operating Nuclear Experience Onsite (yrs) |
|---|---|---|---|---|---|---|---|---|
| 27 | 25 | 6 | 0 | General Manager/Chairman Board (_____) C.E.O* | 34 | 33 | 25 | (10) |
| 27 | 27 | 10 | 0 | Manager Power and Engineering/ President and Chief Operational Officer | 39 | 33 | 3 | 0 |
| | | | | Executive Vice President | 38 | 38 | 21 | - |
| 31 | 27 | 18 | 0 | Manager Engineering/ Vice President Design/Engineer | 36 | 32 | 30 | - |
| 41 | 35 | 16 | 0 | Manager Construction/ Vice President Construction | 36 | 36 | 29 | - |
| 39 | 39 | 9 | 0 | Manager Power Operations/ Vice President Prod. Support | 42 | 35 | 12 | - |
| 26 | 26 | 4 | 0 | Manager Nuclear Power/ Vice President Nuclear Prod.* | 36 | 36 | 18 | (14) |
| | | | | Director, Nuclear Services/ Manager Nuclear Station** | - | 23 | 10 | 8 |
| 17 | 6 | 17 | 0 | Manager Licensing and Risks | | | | |
| 19 | 13 | 15 | 5 | *Manager Maintenance Engineering | | | | |
| 31 | 21 | 31 | 12 | Manager Radiological Health | | | | |
| 21 | 17 | 21 | 0 | Director Quality Assurance | | | | |
| 27 | 8 | 19 | 3 | Chief Training | | | | |

*SRO Equivalence Training
**SRO Licensed (or Prev. Lic)
(○) Experience in Specialty that is Related to Operating Nuclear Experience Onsite

TABLE 6

| TVA | | | | | UTILITY X | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Professional Experience (yrs) | TVA Experience (yrs) | Nuclear Experience (yrs) | Operational Nuclear Experience Onsite (yrs) | Browns Ferry | Professional Experience (yrs) | Utility Experience (yrs) | Nuclear Experience (yrs) | Operating Nuclear Experience Onsite (yrs) | SITE 1 |
| 32 | 32 | 22 | 1¼ | Site Director/General Manager, Nuclear Stations" | "20 | 20 | 8 | 6 | |
| 24 | 24 | 18 | 0 | Design Services Manager/ | | | | | |
| 24 | 24 | 24 | (1) | "RPIP Manager/ | | | | | |
| 15 | 15 | .10 | 0 | Site Services Manager/ | | | | | |
| 13 | 8 | 10 | 0 | Modification Manager/ | | | | | |
| 16 | 2 | 16 | (11) | "QA Manager/ | | | | | |

" SRO Equivalency Training

"" SRO Licensed

(○) Experience in Specialty that is related to operating nuclear experience on site.

TABLE 7

SITE 1

Browns Ferry

| TVA Professional Experience (yrs) | TVA Experience (yrs) | TVA Nuclear Experience (yrs) | TVA Operating Nuclear Experience Onsite (yrs) | | UTILITY X Professional Experience (yrs) | UTILITY X Utility Experience (yrs) | UTILITY X Nuclear Experience (yrs) | UTILITY X Operating Nuclear Experience Onsite (yrs) |
|---|---|---|---|---|---|---|---|---|
| 15 | 10 | 10 | 4 | *Plant Manager/Plant Manager** | 20 | 11 | 20 | -6 |
| 14 | 9 | 14 | 7 | *Oper. & Engineer Supt./Operations Supt.** | -- | 22 | 16 | 16 |
| 31 | 31 | 17 | 17 | **Opers. Supv./Operations Eng.** | -- | 22 | 16 | 16 |
| 14 | 7 | 14 | 6 | Engineer Group Supv./Tech. Serv. Supt. Project Engineer | 13 | 13 | 13 | 13 |
| 26 | 17 | 17 | 3 | *Maint. Supt./Maint. Supt.* | 16 | 13 | 13 | 0 |
| 23 | 12 | 12 | 0 | *Mech. Maint. Supv./Mech. Maint. Engineer | -- | 24 | 16 | 0 |
| 14 | 6 | 6 | (6) | *Elect. Maint. Supv. | | | | |
| 11 | 11 | 11 | (6) | *Instr. Maint. Supv./I&E Engineer | -- | 16 | 30 | 16 |
| 7 | 7 | 7 | (7) | Plan. & Scheduling Supv. | | | | |
| 16 | 7 | 16 | (13) | HP Supervisor/Station HP | -- | 22 | 22 | Same |
| | | | | | | 156 | 157 | 38 |
| 171 | 117 | 124 | (39) | 31 | | | | |

*SRO Equivalence Training
**SRO Licensed (or Prev. Lic)
(○) Experience in Specialty that is Related to Operating Nuclear Experience Onsite

TABLE 8

| | TVA | | | | | | UTILITY X | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Professional Experience (yrs) | TVA Experience (yrs) | Nuclear Experience (yrs) | Operating Nuclear Experience Onsite (yrs) | Sequoyah SITE 2 | | Professional Experience (yrs) | Utility Experience (yrs) | Nuclear Experience (yrs) | Operating Nuclear Experience Onsite (yrs) | |
| - | 32 | 32 | 15 | 4 | Site Director | | | | | | |
| ES | 20 | 20 | 17 | 3 | *Plant Manger/Station Manager** | | 14 | 14 | 14 | 12 | BS |
| BS | 20 | 20 | 12 | 5 | **Oper. and Engr. Supt./Oper. Supt.** | | 23 | 23 | 23 | 18 | |
| - | 21 | 21 | 12 | (7) | **Oper. Supv./Oper. Eng.** | | 14 | 14 | 12 | 12 | BS |
| BS | 11 | 5 | 11 | 4 | *Eng. Group Supv./Preformance Engineer* | | 10 | 10 | 10 | (10) | BS |
| BS | 16 | 16 | 8 | 2½ | Maint. Supt./Supt. of Maint.* | | 11 | 11 | 17 | (11) | BS |
| BS | 12 | 12 | 9 | (7) | *Mech. Maint. Supv./Mech. Maint. Eng.* | | 14 | 14 | 14 | (11) | |
| BS | 10 | 10 | 10 | (4½) | Elect. Maint. Supv. | | | | | | |
| BS | 9 | 9 | 8 | (5) | *Instr. Maint. Supv./I&E Engineer* | | 11 | 11 | 11 | (11) | |
| | | | | | Plan. & Schedul. Supv./Planning Engr.** | | 11 | 11 | 11 | 11 | |
| AS | 11 | 8 | 8 | (8) | HP Supervisor/Station Health Physicist | | 12 | 12 | 12 | (12) | |
| | 130 | 121 | 96 | 18½ | (31½) | | 127 | 120 | 124 | 53 | (11) |

*SRO Equivalence Training
**SRO Licensed (on Prev. Lic)
(○) Experience in Specialty that is related to operating nuclear experience onsite

TABLE 9

SITE 3

WATTS BAR

| TVA | | | | | | UTILITY X | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Professional Experience (yrs) | TVA Experience (yrs) | Nuclear Experience (yrs) | Operating Nuclear Experience Onsite (yrs) | | Professional Experience (yrs) | Utility Experience (yrs) | Nuclear Experience (yrs) | Operating Nuclear Experience Onsite (yrs) |
| BS | 17 | 5 | 17 | 5 | **Site Director | 27 | 27 | 18 | 17 |
| BS | 22 | 22 | 8 | 0 | *Plant Manager/Station Manager** | 22 | 18 | 18 | 16 |
| BS | 18 | 14 | 18 | 3 | *Oper. & Engineer. Supt./Operations Supt.** | 19 | 13 | 19 | 13 |
| BS | 20 | 20 | 12 | 1 | **Operations Supv./Operating Engineer** | 14 | 12 | 9 | 7 |
| BS | 15 | 15 | 13 | 0 | *Engineer. Group Supv./Performance Engineer* | 26 | 19 | 10 | 3 |
| BS | 13 | 13 | 13 | 0 | Maintenance Supt./Supt. of Maintenance | 15 | 11 | 11 | 0 |
| BS | 16 | 16 | 12 | 0 | *Mech. Maint. Supv./Mech. Maint. Engineer | | | | |
| BS | 10 | 10 | 10 | ¼ | Elect. Maintenance Supv. | 18 | 13 | 13 | 11 |
| BS | 12 | 8 | 12 | 1¼ | Instr. Maint. Supv./I&E Engineer | 13 | 11 | 7 | 7 |
| | | | | | Plan. & Schedule Supv./Planning Engineer | 19 | 19 | 17 | (17) |
| BA | 17 | 6 | 17 | (17) | HP Supervisor/Station Health Physicist | 173 | 143 | 122 | (74) |
| | 143 | 124 | 115 | (17) | | | | | |

*SRO Equivalence Training
**SRO Licensed (on Prev. Lic)
Experience in Specialty That is
(○) Related to Operating Nuclear
Experience Onsite

TVA

SENIOR MANAGEMENT

TABLE 10

UTILITY Y

| Professional Experience (yrs) | TVA Experience (yrs) | Nuclear Experience (yrs) | Operating Nuclear Experience Onsite (yrs) | TVA | Professional Experience (yrs) | Utility Experience (yrs) | Nuclear Experience (yrs) | Operating Nuclear Experience Onsite (yrs) | |
|---|---|---|---|---|---|---|---|---|---|
| 27 | 25 | 6 | 0 | General Mgr./Chair./President/ Mgr. Nuc. Safety | - | - | - 28 | - yes Su.&Opn. | SR |
| 27 | 27 | 10 | 0 | Mgr. Power and Engineering/ Exec. Vice President | - | - | - | - | |
| 31 | 27 | 18 | 0 | Manager Engineering | - | - | - | - | |
| 41 | 35 | 16 | 0 | Manager Construction/ | - | 30 | - | - | |
| 38 | 38 | 8 | 0 | Mgr. Power Operations/Exec. Vice Pres/Fossil Operations | - Extensive Nuclear | | | | |
| 26 | 26 | 4 | 0 | Mgr. Nuclear Power/V.P. Nuclear | 25 | 25 | 17 | yes Su.&Opn. | SR |
| | | | | Director, Nuclear Services/ Asst. V.P. Nuclear Services | | 35 | 24 | yes Su.&Opn. | Pl Su |
| 17 | 6 | 17 | 0 | Mgr. Licensing & Risks/Asst. V.P. Eng. & Lic. | - | - | 11 | yes Sta. Nuc. eng. | |
| 19 | 13 | 15 | 5 | *Mgr. Maint./Maint. Mgr. | - | 14+ | 14 | yes Sta. Nuc. eng. | |
| 31 | 21 | 31 | 12 | Mgr. Rad. Health/Dir. Rad. Prot. | - | - | 9 | yes | S |
| 21 | 17 | 21 | 0 | Dir. Quality Assurance/Dir. QA | - | - | 15 | 0 | |
| 27 | 8 | 19 | 3 | Chief Training/Prod. Trn. Mgr. | | | 22 | | |

*SRO Equivalence Training
**SRO Licensed (or Prev. Lic)
○ Experience in Specialty that is Related to Operating Nuclear Experience Onsite

TABLE 11

Browns Ferry

| Degree | TVA Professional Experience (yrs) | TVA Experience (yrs) | TVA Nuclear Experience (yrs) | TVA Operating Nuclear Experience Onsite (yrs) | | SITE 4 Professional Experience (yrs) | UTILITY X Utility Experience (yrs) | UTILITY X Nuclear Experience (yrs) | UTILITY X Operating Nuclear Experience Onsite (yrs) |
|---|---|---|---|---|---|---|---|---|---|
| yes | 15 | 10 | 10 | 4 | *Plant Manager/Plant Manager | 22 | 22 | 13 | 13 |
| yes | 14 | 9 | 14 | 7 | *Oper. & Engineer Supt./Supt. Prod.** | 15 | 15 | 12 | 12 |
| no | 31 | 31 | 17 | 17 | **Opers. Supv./Asst. Supt. Oper.** | 16 | 16 | 16 | 10 |
| yes | 14 | 7 | 14 | 6 | Engineer Group Supv./Asst. Supt. Tech. Serv.** | 15 | 15 | 8 | 8 |
| yes | 26 | 17 | 17 | 3 | *Maint. Supt./ Asst. Supt. Maint. | 12 | 12 | 5 | 5 |
| yes | 23 | 12 | 12 | 0 | *Mech. Maint. Supv. / Master Mechanic | 13 | 13 | 18 | 13 |
| yes | 14 | 6 | 6 | (0) | *Elect. Maint. Supv./ Master Electrician | 10 | 29 | 6 | 6 |
| yes | 11 | 11 | 11 | (6) | *Instr. Maint. Supv./ Master I&C | 13 | 13 | 13 | 13 |
| yes | 7 | 7 | 7 | (3) | Plan. & Scheduling Supv. | - | - | - | - |
| yes | 16 | 7 | 16 | (13) | HP Supervisor/ Rad Chem Supv. | 7 | 7 | 7 | 7 |
| | 171 | 117 | 124 | (39) | 31 | 123 | 142 | 98 | 87 |

*SRO Equivalence Training
**SRO Licensed (or Prev. Lic)
(○) Experience in Specialty that is Related to Operating Nuclear Experience Onsite

TABLE 12

Browns Ferry

SITE 5

| Degree | TVA Professional Experience (yrs) | TVA Experience (yrs) | TVA Nuclear Experience (yrs) | TVA Operating Nuclear Experience Onsite (yrs) | | UTILITY Y Professional Experience (yrs) | UTILITY Y Utility Experience (yrs) | UTILITY Y Nuclear Experience (yrs) | UTILITY Y Operating Nuclear Experience Onsite (yrs) | |
|---|---|---|---|---|---|---|---|---|---|---|
| yes | 15 | 10 | 10 | 4 | *Plant Manager / Station Manager** | 35 | 35 | 18 | 18 | y |
| yes | 14 | 9 | 14 | 7 | *Oper. & Engineer Supt. / Supt. Prod.** | 15 | 15 | 21 | 15 | y |
| no | 31 | 31 | 17 | 17 | **Opers. Supv. / Asst. Supt. Opn.** | 15 | 15 | 15 | 15 | y |
| no | 14 | 7 | 14 | 6 | Engineer Group Supv. / Asst. Supt. Tech. Support** | 21 | 21 | 17 | 17 | y |
| yes | 26 | 17 | 17 | 3 | *Maint. Supt. / Asst. Supt. Maint. | 12 | 12 | 8 | 8 | y |
| yes | 23 | 12 | 12 | 0 | *Mech. Maint. Supv. / Master Mech. | 21 | 15 | 21 | 15 | n |
| yes | 14 | 6 | 6 | (6) | *Elect. Maint. Supv./ Master Elec. | 6 | 6 | 6 | 6 | y |
| yes | 11 | 11 | 11 | (10) | *Instr. Maint. Supv./ Master I&C | 21 | 15 | 15 | 15 | n |
| | 7 | 7 | 7 | (7) | Plan. & Scheduling Supv. | | | | | |
| yes | 16 | 7 | 16 | (13) | HP Supervisor / Rad. Chem. Supv. | 7 | 7 | 13 | 7 | y |
| | 171 | 117 | 124 | (39) | 31 | 153 | 141 | 134 | 115 | |

*SRO Equivalence Training
**SRO Licensed (or Prev. Lic)
(○) Experience in Specialty that is Related to Operating Nuclear Experience Onsite

SITE MANAGEMENT

TABLE 13

| TVA | | | | | | UTILITY Y | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Degree | Professional Experience (yrs) | TVA Experience (yrs) | Nuclear Experience (yrs) | Operating Nuclear Experience Onsite (yrs) | Sequoyah | Professional Experience (yrs) | Utility Experience (yrs) | Nuclear Experience (yrs) | Operating Nuclear Experience Onsite (yrs) | Degree |
| | | | | | SITE 6 | | | | | |
| - | 32 | 32 | 15 | 4 | Site Director/ | | | | | |
| ES | 20 | 20 | 17 | 3 | *Plant Manger/Station Manager** | 24 | 24 | 24 | 15 | yes |
| BS | 20 | 20 | 12 | 5 | **Oper. and Engr. Supt./ Supt. Prod.** | 18 | 18 | 18 | 15 | yes |
| - | 21 | 21 | 12 | (7) | **Oper. Supv./Asst. Supt. Opn.** | 12 | 12 | 19 | 12 | yes |
| BS | 11 | 5 | 11 | 4 | *Eng. Group Supv./Asst. Supt. Tech. Serv** | 16 | 16 | 16 | 7 | yes |
| BS | 16 | 16 | 8 | 2½ | Maint. Supt./ Asst. Supt. Maint. | 14 | 14 | 14 | 8 | yes |
| BS | 12 | 12 | 9 | (7) | *Mech. Maint. Supv./ Master Mech.** | 9 | 9 | 7 | 7 | yes |
| BS | 10 | 10 | 10 | (4½) | Elect. Maint. Supv./ Master Elect. | 36 | 28 | 14 | 14 | no |
| BS | 9 | 9 | 8 | (5) | *Instr. Maint. Supv./ Master I&C** | 10 | 10 | 7 | 6 | yes |
| | | | | | Plan. & Schedul. | | | | | |
| AS | 11 | 8 | 8 | (8) | HP Supervisor/ Rad. Chem. Supv.* | 9 | 9 | 9 | 9 | yes |
| | 130 | 121 | 96 | 18½ | (31½) | 148 | 140 | 118 | 93 | |

*SRO Equivalence Training
**SRO Licensed (on Prev. Lic)
(○) Experience in Specialty that is related to operating nuclear experience onsite

TVA — SITE MANAGEMENT — UTILITY Y

TABLE 14

| Degree | Professional Experience (yrs) | TVA Experience (yrs) | Nuclear Experience (yrs) | Operating Nuclear Experience Onsite (yrs) | Sequoyah | Professional Experience (yrs) | Utility Experience (yrs) | Nuclear Experience (yrs) | Operating Nuclear Experience Onsite (yrs) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SITE 7 | | | | |
| - | 32 | 32 | 15 | 4 | Site Director | | | | | |
| ES | 20 | 20 | 17 | 3 | *Plant Manger/Sta. Mgr.** | 26 | 23 | 22 | | y |
| BS | 20 | 20 | 12 | 5 | **Oper. and Engr. Supt./Supt. Prod.** | 19 | 19 | 19 | | y |
| - | 21 | 21 | 12 | (7) | **Oper. Supv./ Asst. Supt. OPN** | 9 | 18 | 9 | | y |
| BS | 11 | 5 | 11 | 4 | *Eng. Group Supv./Asst. Supt. Tech.Supt.** | 16 | 16 | 16 | | y |
| BS | 16 | 16 | 8 | 2¼ | Maint. Supt./ Asst. Supt. Maint. | 14 | 4 | 4 | | y |
| BS | 12 | 12 | 9 | (7) | *Mech. Maint. Supv./Master Mech. | 14 | 16 | 14 | | y |
| BS | 10 | 10 | 10 | (4¼) | Elect. Maint. Supv./Master Elect. | 23 | 11 | 15 | | y |
| BS | 9 | 9 | 8 | (5) | *Instr. Maint. Supv./Master I&L Plan. & Schedul. | 19 | 18 | 11 | | y |
| AS | 11 | 8 | 8 | (8) | HP Supervisor/ RAD. Chem. Supv. | 26 | 26 | 13 | | y |
| | 130 | 121 | 96 | 18¼ | (31¼) | 166 | 151 | 123 | | |

*SRO Equivalence Training
**SRO Licensed (on Prev. Lic)
(○) Experience in Specialty that is related to operating nuclear experience onsite

TABLE 15

| TVA | | | | | | UTILITY Y | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Degree | Professional Experience (yrs) | TVA Experience (yrs) | Nuclear Experience (yrs) | Operating Nuclear Experience Onsite (yrs) | WATTS BAR | Professional Experience (yrs) | Utility Experience (yrs) | Nuclear Experience (yrs) | Operating Nuclear Experience Onsite (yrs) | |
| | | | | | | SITE 8 | | | | |
| BS | 17 | 5 | 17 | 5 | **Site Director | | | | | |
| BS | 22 | 22 | 8 | 0 | *Plant Manager/ Sta. Supt.** | 20 | 22 | 16 | 8 | ye |
| BS | 18 | 14 | 18 | 3 | *Oper. & Eng. Supt./Supt. Prod. | | vacant | | | |
| -- | 20 | 20 | 12 | 1 | **Operations Supv./ Assit. Supt. Opn.** | 22 | 22 | 22 | 9 | ye |
| BS | 15 | 15 | 13 | 0 | *Eng. Group Supv./Asst. Supt. Tech. Serv.** | 17 | 12 | 12 | 8 | ye |
| BS | 13 | 13 | 13 | 0 | Maintenance Supt. / Asst. Supt. Maint.** | 18 | 18 | 14 | 8 | ye |
| BS | 16 | 16 | 12 | 0 | *Mech. Maint. Supv./Master Mech. | 29 | 24 | 13 | 8 | no |
| BS | 10 | 10 | 10 | ¼ | Elect. Maintenance Supv./ Master Elec. | 15 | 14 | 10 | 4 | ye |
| BS | 12 | 8 | 12 | 1¼ | Instr. Maint. Supv./ Master I&C** | 11 | 11 | 7 | 1 | ye |
| | | | | | Plan. & Schedule Supv./ | - | - | - | - | |
| BA | 17 | 6 | 17 | (17) | HP Supervisor/ Rad. Chem. Supv. | 11 | 10 | 9 | 3 | ye |
| | 143 | 124 | 115 | (47) | | 143 | 131 | 103 | 49 | |

*SRO Equivalence Training
**SRO Licensed (on Prev. Lic)
(○) Experience in Specialty That is Related to Operating Nuclear Experience Onsite

# FUNCTIONAL AREA COMPARISON

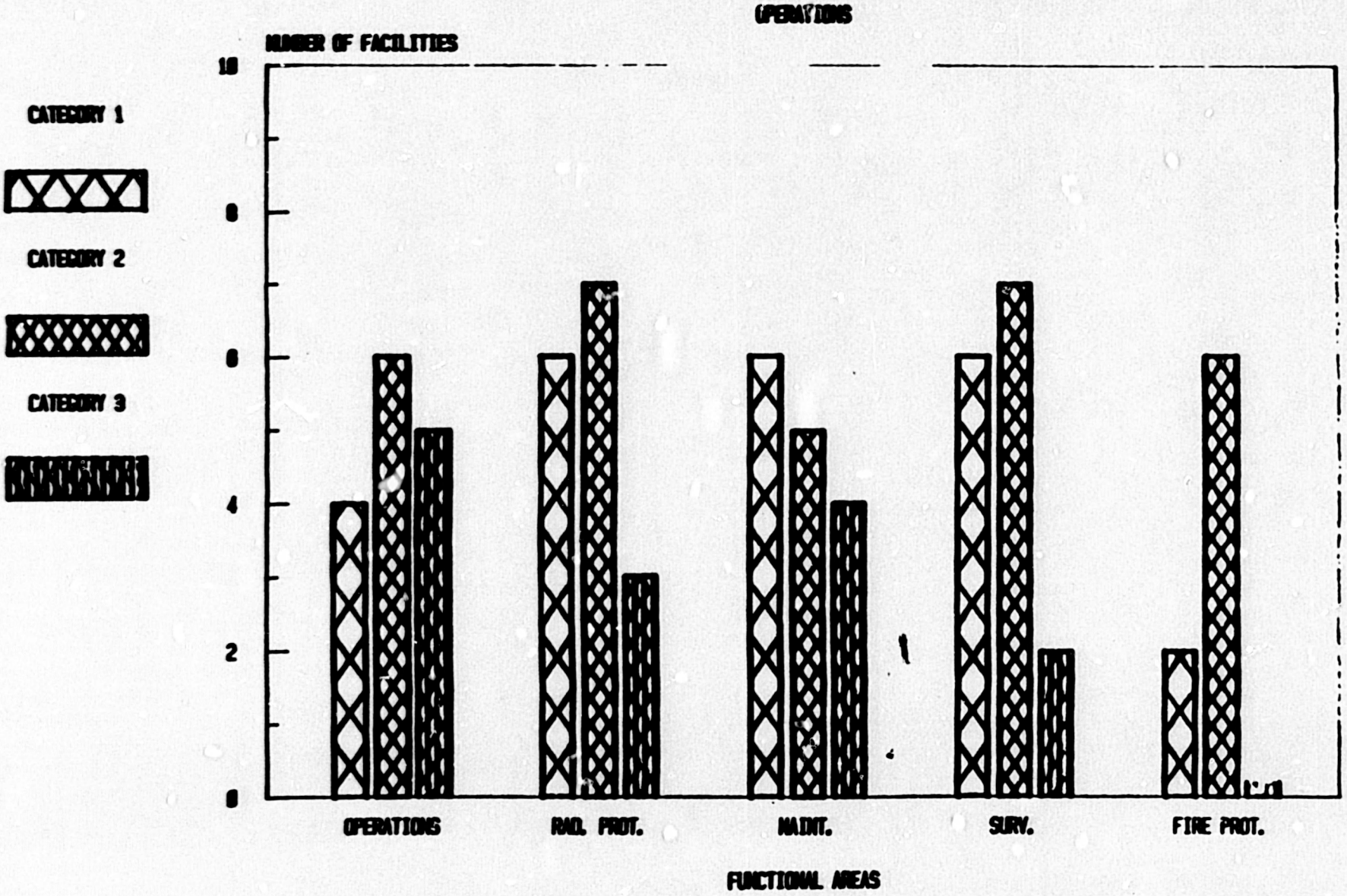



FIGURE 1

# FUNCTIONAL AREA COMPARISON

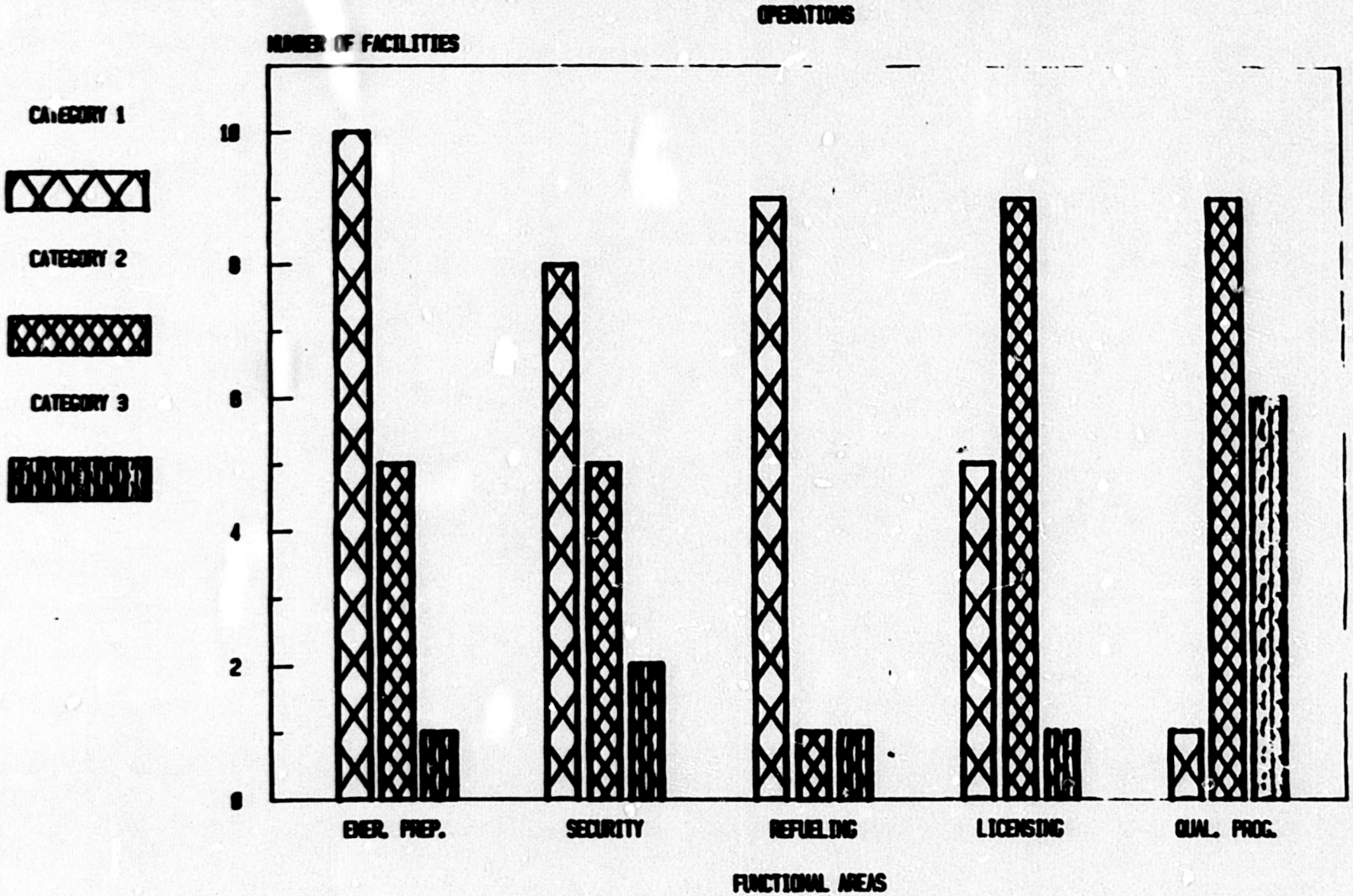



FIGURE 2

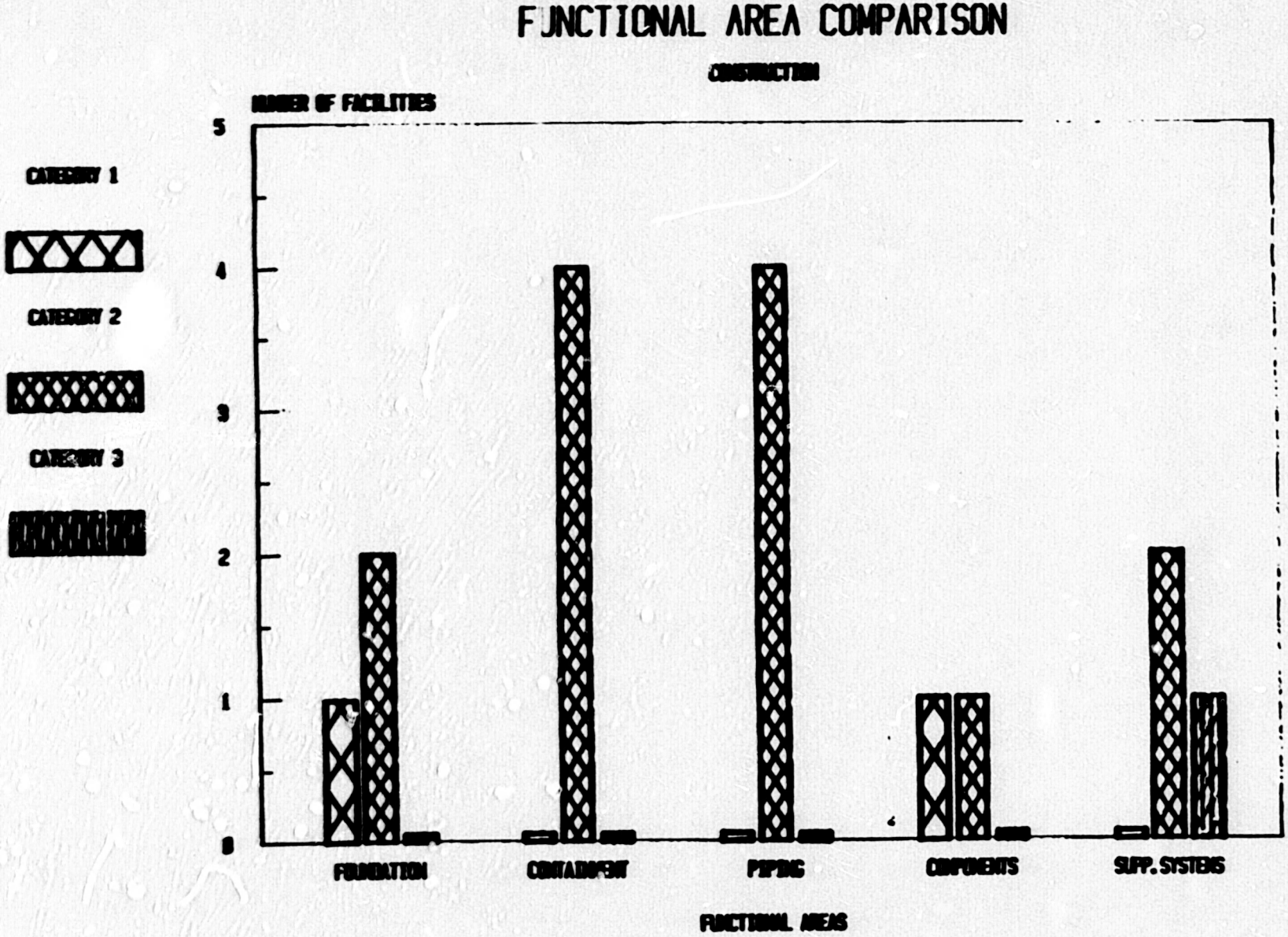

FUNCTIONAL AREA COMPARISON
CONSTRUCTION
NUMBER OF FACILITIES
5
4
3
2
1
0
CATEGORY 1
CATEGORY 2
CATEGORY 3
FOUNDATION
CONTAINMENT
PIPING
COMPONENTS
SUPP. SYSTEMS
FUNCTIONAL AREAS

FIGURE 3

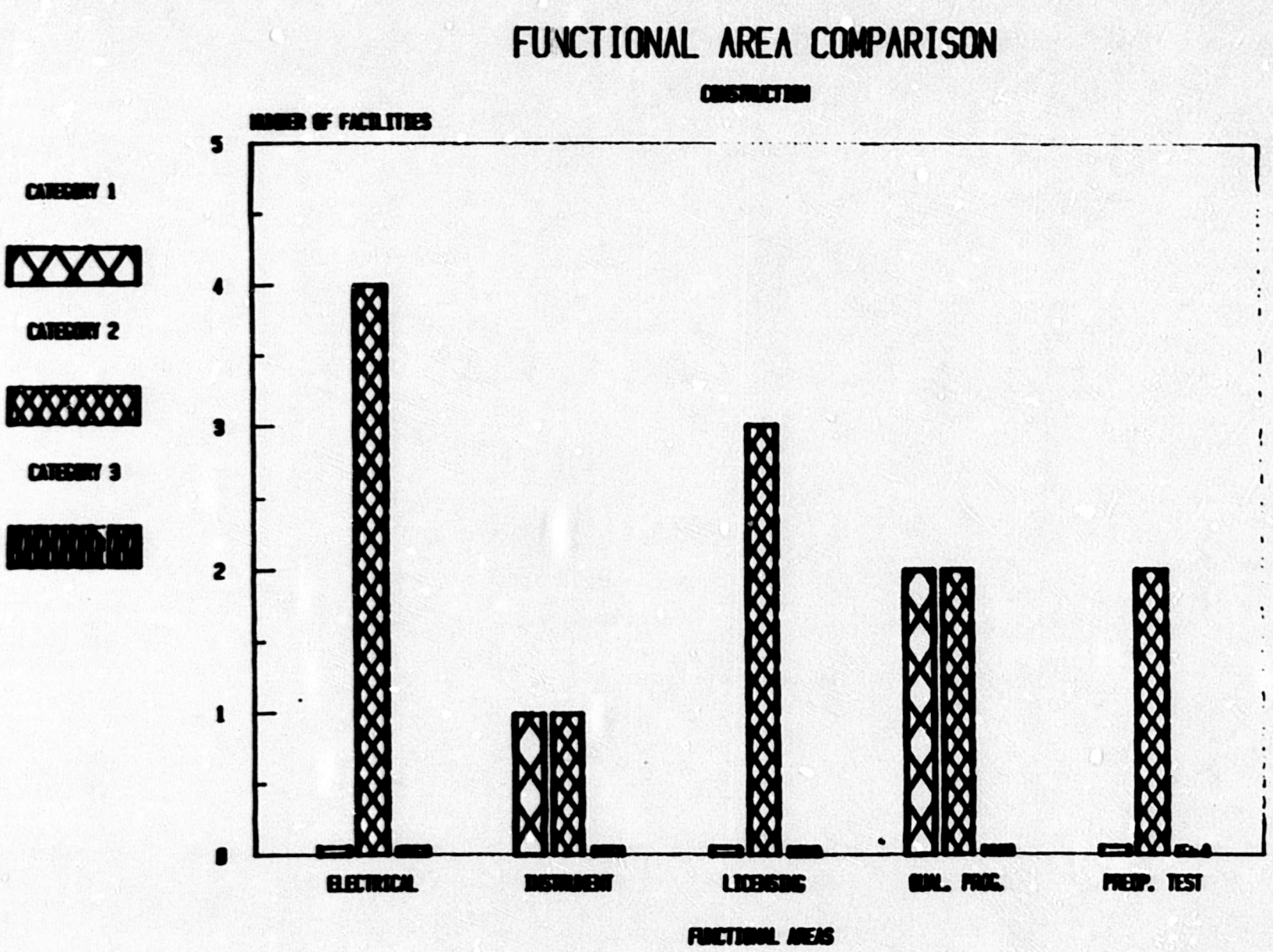

FUNCTIONAL AREA COMPARISON
CONSTRUCTION
NUMBER OF FACILITIES
5
4
3
2
1
0
CATEGORY 1
CATEGORY 2
CATEGORY 3
ELECTRICAL
INSTRUMENT
LICENSING
QUAL. PROG.
PREOP. TEST
FUNCTIONAL AREAS

FIGURE 4

# ENFORCEMENT HISTORY ANALYSIS

JULY 1981 - JUNE 1985

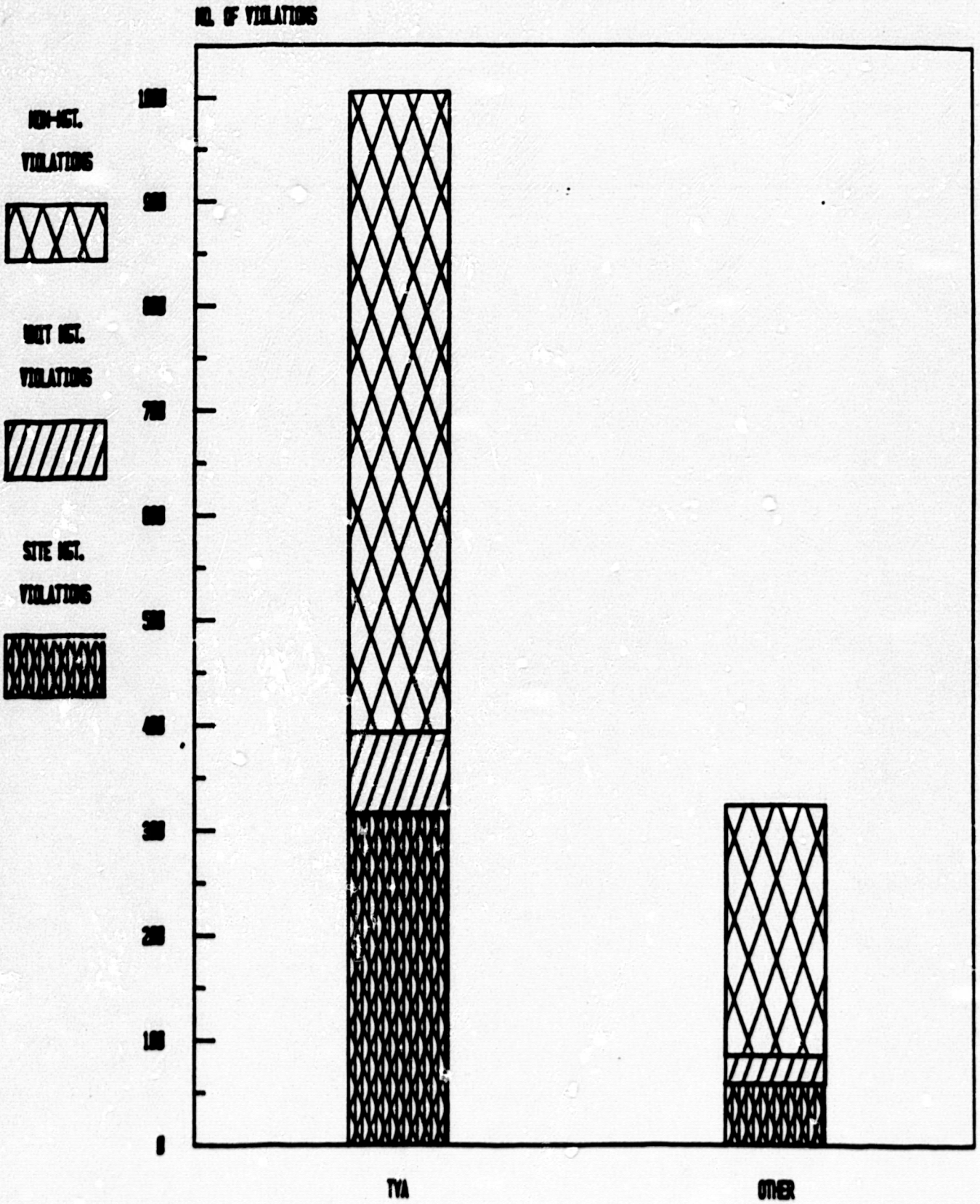
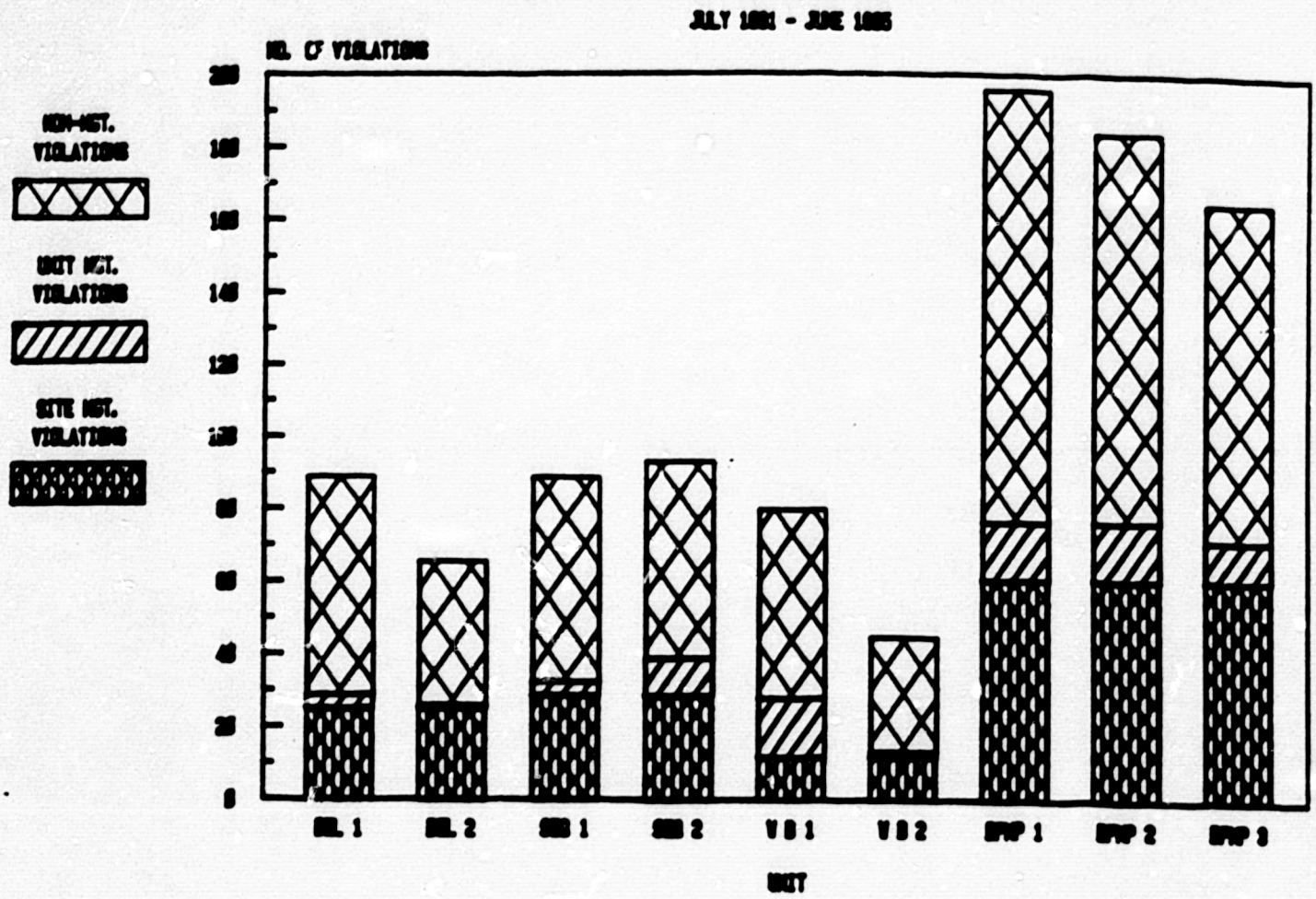



FIGURE 5


ENFORCEMENT HISTORY ANALYSIS
JULY 1981 - JUNE 1985
NO. OF VIOLATIONS
NON-SIT. VIOLATIONS
UNIT SIT. VIOLATIONS
SITE SIT. VIOLATIONS
UNIT

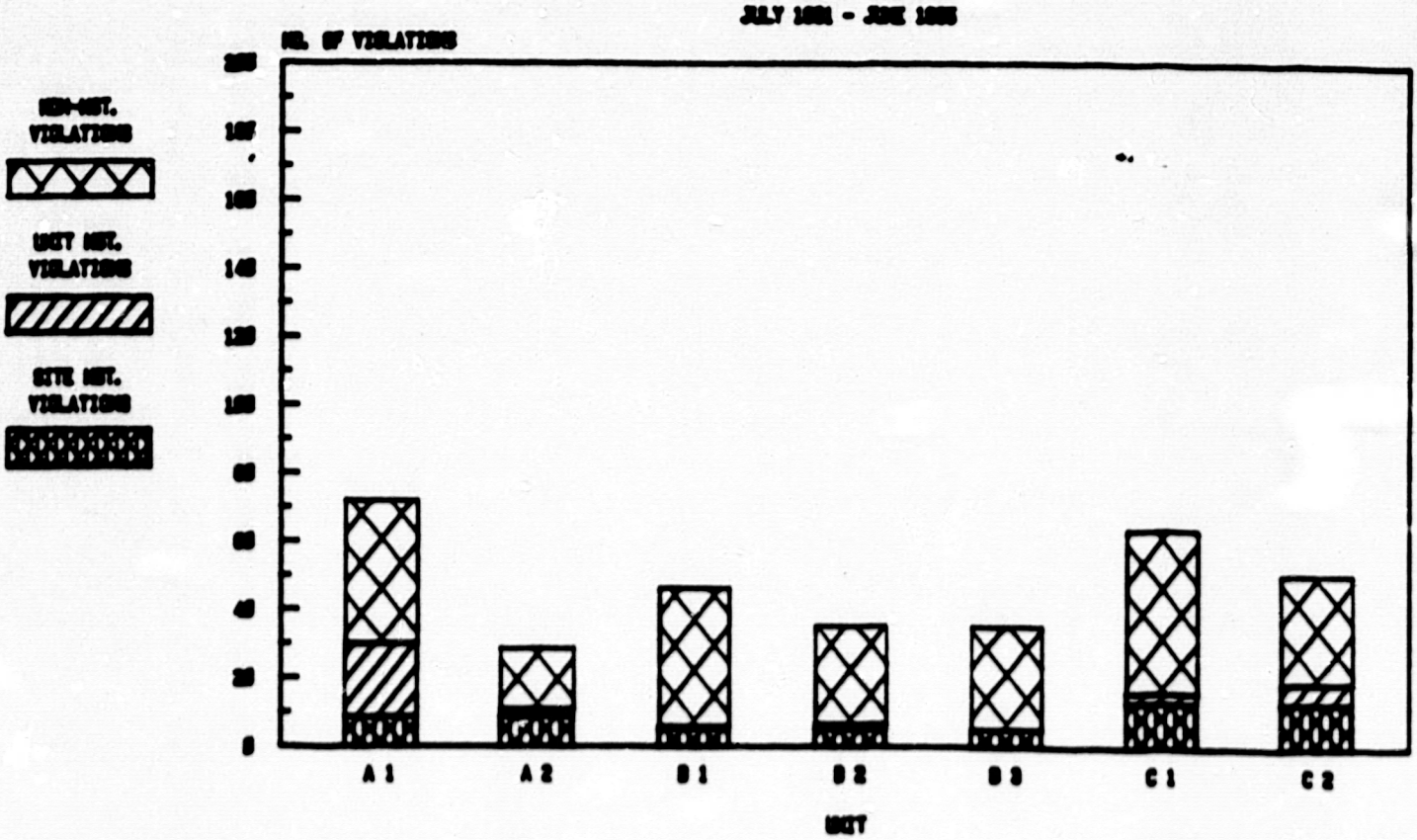

ENFORCEMENT HISTORY ANALYSIS
JULY 1981 - JUNE 1985
NO. OF VIOLATIONS
NON-SIT. VIOLATIONS
UNIT SIT. VIOLATIONS
SITE SIT. VIOLATIONS
A1
A2
B1
B2
B3
C1
C2
UNIT

FIGURE 6

# OPERATIONS PHASE VIOLATIONS/UTILITY/SITE

SEPTEMBER 1983 - FEBRUARY 1985

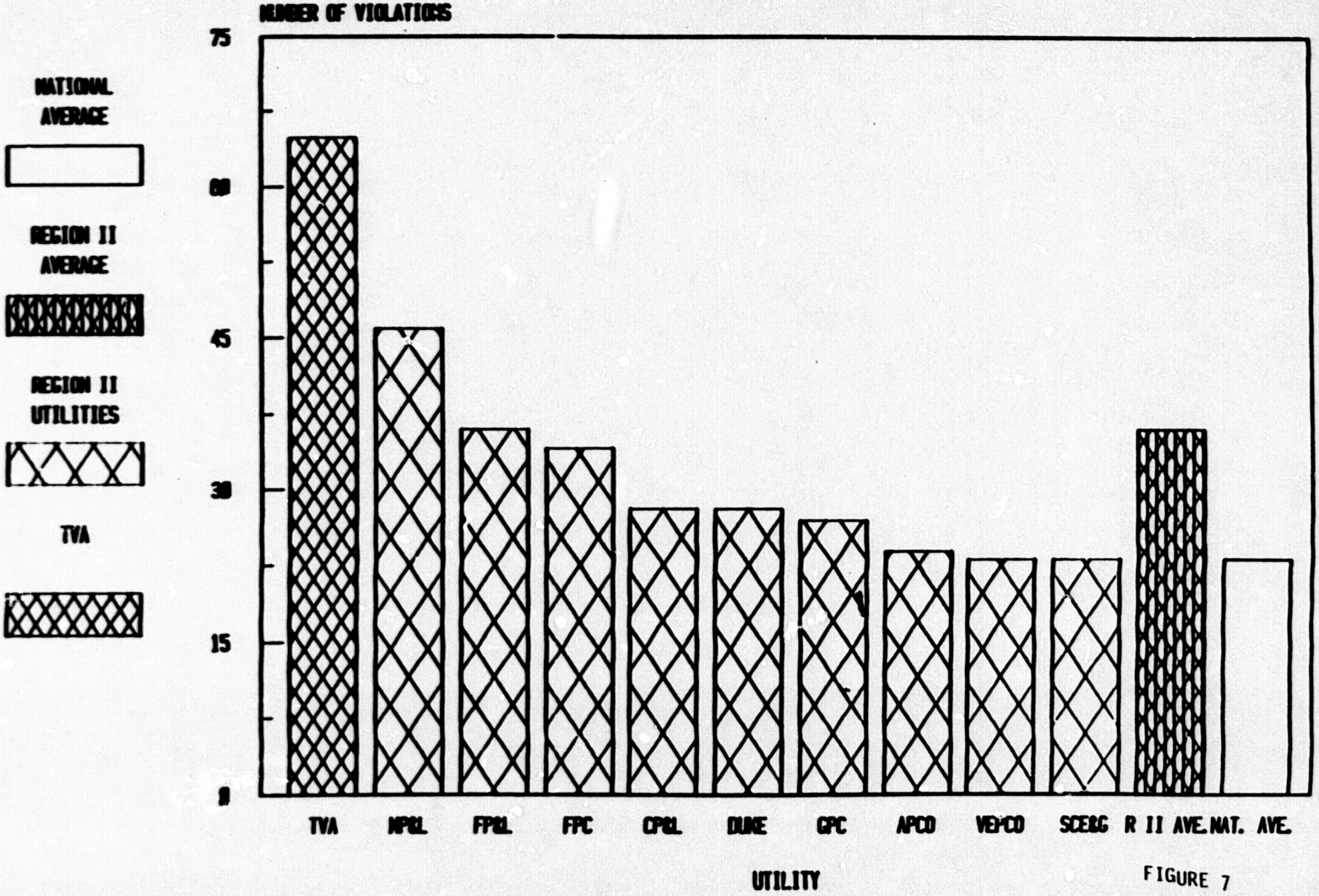



FIGURE 7

NUMBER OF CIVIL PENALTIES

DOLLAR VALUE (HUNDRED THOUSANDS)

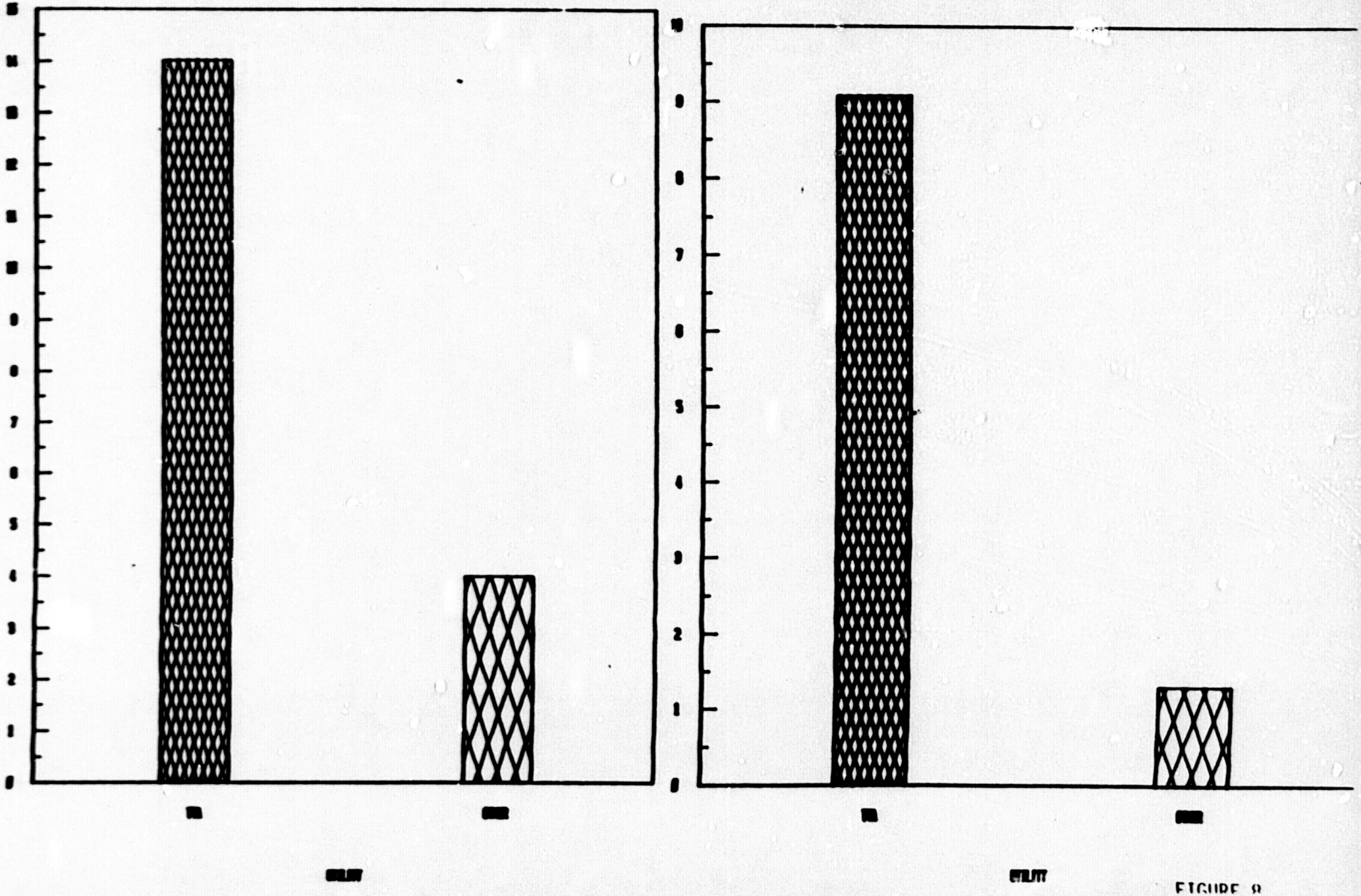
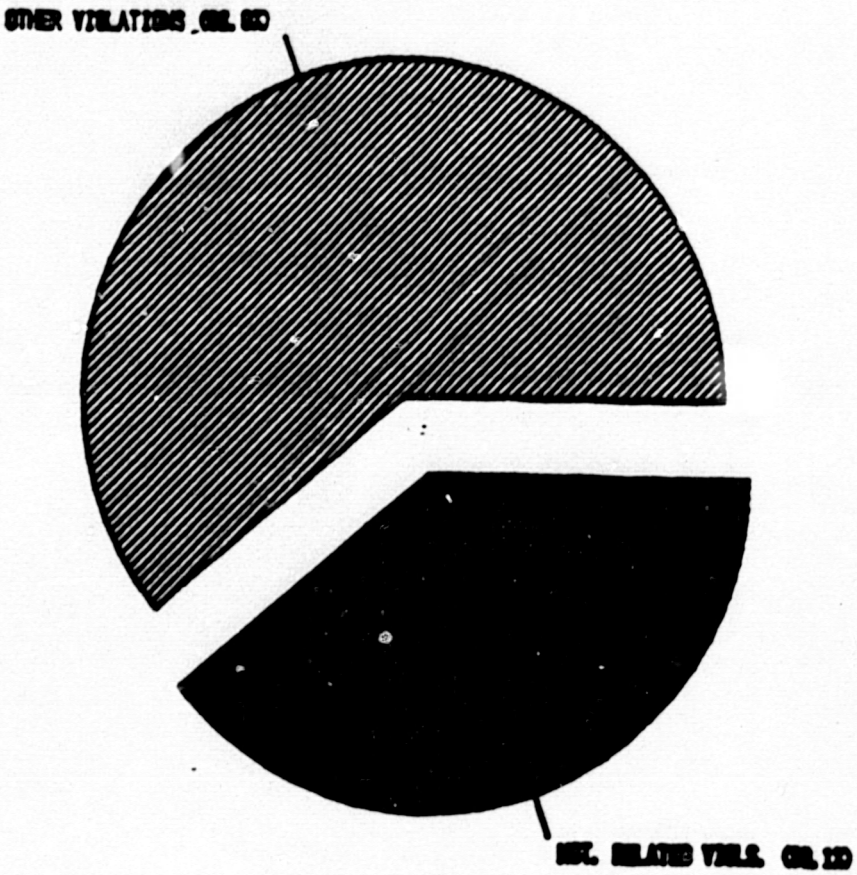


FIGURE 8

# TVA ENFORCEMENT HISTORY ANALYSIS

JULY 1981 - JUNE 1985




# NON-TVA ENFORCEMENT HISTORY ANALYSIS

JULY 1981 - JUNE 1985

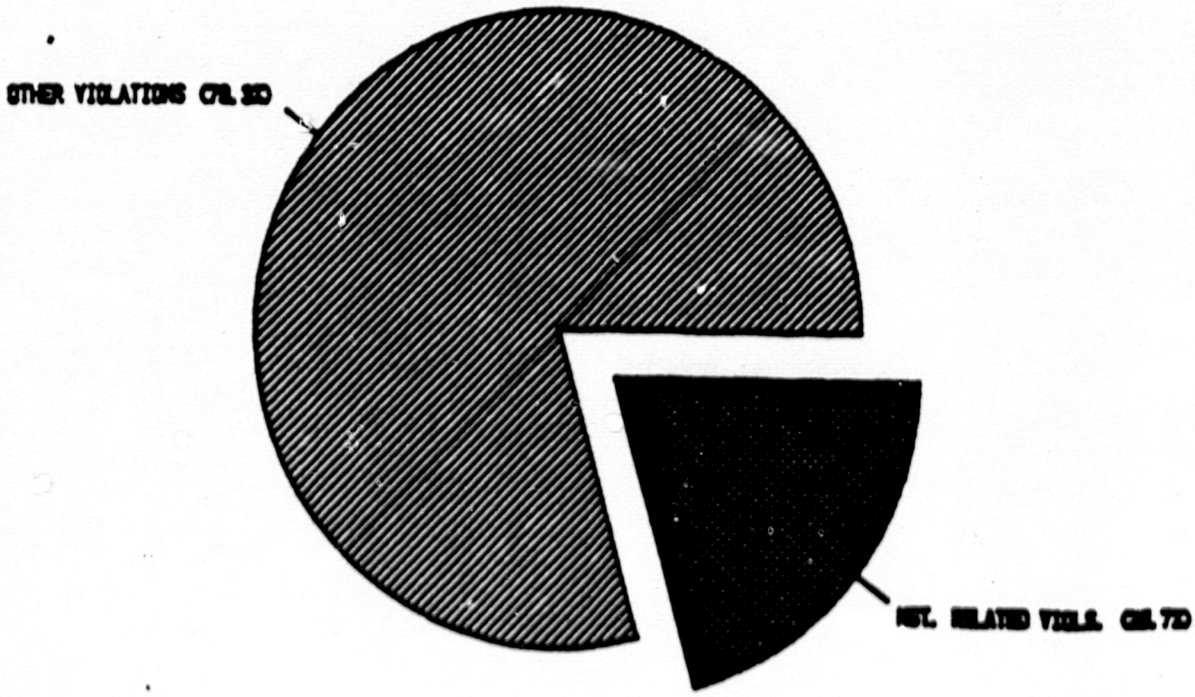



FIGURE 9